Remarks

We thank the Examiner for allowing claims 1-4 and 9-15 and for the indication of Allowability of claims 6 and 7. However, in light of the comments presented below, in which we traverse the rejections of claims 5 and 8, claims 6 and 7 have not been rewritten in independent form.

The Examiner has rejected Claims 5 and 8 under 35 USC 103(a) as being unpatentable over U.S. Patent No. 5,774,496 to Butler et al (hereinafter "Butler") in view of US application 2003/0007577 to Shiu et al (hereinafter "Shiu"). We respectfully submit that: (1) the Examiner has failed to establish a *prima facie* case of obviousness; and (2) the inventions recited in claims 5 and 8 are unobvious over the teachings of Butler or Shiu (or, without admitting that these references can be combined, even the combination thereof).

In the rejection, the Examiner admits that Butler fails to compute a "mean absolute LLR value", as recited in claim 5, for determining the transmission rate. Instead, according to the Examiner, Butler teaches computing a Yamamoto quality metric for each rate to aid the determination of the transmission rate. Then, the examiner states that Shiu teaches the use of the average LLR of decoded bits as a performance metric. The examiner then concludes that the claimed invention is obvious as it would be obvious to substitute the average LLR of Shiu for the Yamamoto metric of Butler, as stipulated by a Supreme Court (KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385 (hereinafter "KSR"), which held that "[W]hen a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result".

We respectfully submit that this is not sufficient to sustain a *prima facie* case of obviousness; does not comply with the cited KSR decision; and, in any event, is simply untrue.

In the Official Action dated July 6, 2007, the examiner alleged claims 5 and 8 were obvious in view of Butler alone, alleging that Butler taught all of the claim elements except used a Yamamoto metric, alleged LLR was a known metric, and an obvious alternative to the Yamamoto metric. In our prior response of November 29, 2007, we previously argued that this was not the case, and provided reasons why it would not be obvious to substitute LLR or the mean absolute LLR for the Yamamoto metric of Butler.

The examiner appears to have simply located a reference which teaches the use of LLR (and in the particular case of Shiu, the average LLR for a turbo decoder), cites KSR and then makes an unsupported (and we respectfully submit, unsupportable) allegation that it would be obvious to substitute the average LLR of Shiu for the Yamamoto metric of Butler.

However, for the reasons already on record, we submit that a person skilled in the art would not have been motivated to combine Shiu with Butler, and they can not be combined in any event, as LLR (or average LLR (as taught by Shiu) or mean absolute LLR (as claimed) is not a substitute for the Yamamoto metric.

We quote from our prior response:

> "As is known, the Yamamoto metric is a binary frame quality indicator, i.e., it is a binary number (0 or 1) which is a metric for the entire frame. By contrast, as discussed below, neither LLR per se (which is a bit quality indicator), nor mean absolute LLR (which is a frame quality indicator), is a binary number.
>
> LLR denotes the Log-Likelihood-Ratio of a bit and is equal to log(p/(1-p)), where p denotes the probability of the bit being a 1 and (1-p) denotes the probability of the bit being a 0. Significantly, the LLR of a bit is a continuous number, not a binary number. An LLR having a positive value indicates that the bit is more likely to be a 1, whereas an LLR having a negative value means that the bit is more likely to be a 0. Clearly, LLR *per se* is not a frame quality indicator because every bit in the frame has an LLR value.
>
> Mean absolute LLR is equal to the sum of the absolute values of the LLRs of all the bits in a frame divided by the number of bits in the frame. Mean absolute LLR is a metric for the entire frame. However, like the LLR of an individual bit, mean absolute LLR is a continuous number, not a binary number.
>
> As noted above, the Yamamoto quality metric is a binary number, i.e., a single bit, which is indicative of whether the frame is correctly decoded or not.

Indeed, Butler et al. specifically states in column 6 that the Yamamoto quality metrics are each typically represented by a 1 bit value for each frame. By contrast, "mean absolute LLR value", as recited in claim 5, is a continuous number. We respectfully submit that it would not be obvious to substitute "mean absolute LLR value" for the Yamamoto quality metric used in Butler because, among other reasons, the former is a continuous number, whereas the latter is a binary number. This conclusion is reinforced by the fact that there is no mention of LLR or "mean absolute LLR value" in Butler. Moreover, the Viterbi decoders discussed in Butler for example, at col. 5, lines 65 to col. 6, line 25, do not normally output LLRs, and this fact alone would deter one of ordinary skill in the art from even considering the use of LLRs or "mean absolute LLR value". Consequently, in the opinion of the applicants, the teachings of Butler would not lead one of ordinary skill in the art to the invention recited in claim 5 and, because claim 8 depends from claim 5, would not lead one of ordinary skill in the art to the invention recited in claim 8.

Accordingly, we respectfully submit that the rejection fails to establish a *prima facie* case of obviousness, and therefore should be withdrawn. Furthermore, and in any event we respectfully submit that the claimed subject matter is not obvious in light of Butler. Accordingly we respectfully request the withdrawal of the rejections of claims 5 and 8. "

In addition, we make the following additional observations. Shiu is directed to a turbo decoder, and teaches how to find the right scaling factor for turbo decoder in order to achieve optimal decoding performance. Shiu is not directed to transmission rate determination, and Shiu does not provide any teaching or suggestion of using average LLR for determining the transmission rate.

Butler teaches how to determine transmission rate for a convolutionally encoded system. We submit that Butler's method only applies to convolutional codes because the Yamamoto metric is not applicable to turbo coders.

In the IDS filed concurrently herewith, we submit a paper which explains the mean absolute LLR in more detail. We do not admit that this paper constitutes prior art. Indeed, the paper

itself is dated October 2003, which is after the filing date of the present application. We are submitting this as part of an IDS as the paper itself makes reference to earlier conferences, which the inventor has not seen. However, even if this is prior art, we deny this renders the subject matter obvious, and submit that a teaching of mean absolute LLR for use in determining when to stop turbo decoding processing does not render the claims obvious for the reasons already given.

Furthermore, Shiu teaches the use of the average LLR and not the mean absolute LLR. These are different metrics, and can yield very different results. For example when summing each individual LLR together for the purpose of calculating an average, LLRs for bit "1" and bit "0" can cancel each other because they can have opposite signs. As a result, an average LLR can be low when the mean absolute mean can be high. Accordingly, even if the references could be combined, which is denied for the reasons given, the rejection still fails to establish a prima facie case as the combination still does not teach the claimed subject matter.

Accordingly, we submit that this is not a case of mere substitution of one element for another known in the field. Furthermore a person skilled in the art would have no reason to combine the teachings of Butler and Shiu and even if the references could be combined (which is denied for the reasons given), the examiner has not demonstrated why combining different metrics, which are used in the art for different purposes, would yield a predictable result.

Accordingly, each of claims 5, 6, 7 and 8 are now allowable and a Notice of Allowance is hereby requested.

No fee is believed due for this submission. However, Applicant authorizes the Commissioner to debit any required fee from Deposit Account No. 501593, in the name of Borden Ladner Gervais LLP. The Commissioner is further authorized to debit any additional amount required, and to credit any overpayment to the above-noted deposit account.

Respectfully submitted,

XUE, Guoqiang et al

By: /Jeffrey M. Measures/

Jeffrey M. Measures
Reg. No. 40,272
Borden Ladner Gervais LLP
World Exchange Plaza
100 Queen Street, Suite 1100
Ottawa, ON K1P 1J9
CANADA
Tel: (613) 237-5160
Fax: (613) 787-3558
E-mail: ipinfo@blgcanada.com

JMM/dbm